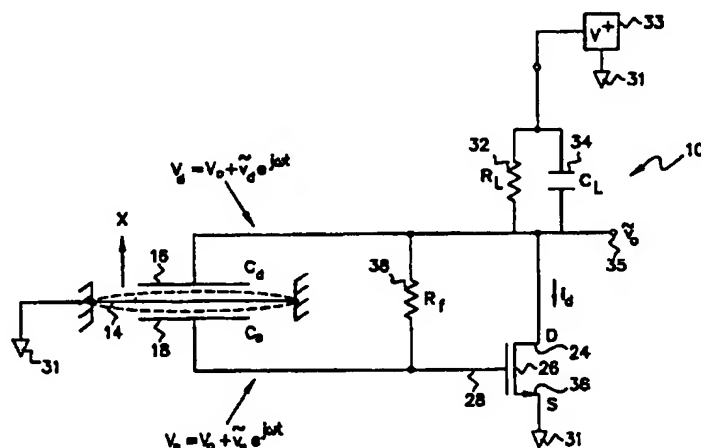




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(54) Title: INTEGRATED RESONANT MICROBEAM SENSOR AND TRANSISTOR OSCILLATOR



(57) Abstract

At least one microbeam situated on a substrate, having a resonant frequency dependent on the strain on the microbeam which may be affected by the bending of the substrate. The beam or beams have sense and drive electrodes proximate to the beam or beams and form capacitors with a beam being the other electrode. The capacitance varies as the beam moves in vibration. The sense electrode is connected to an input of a transistor, such as the gate or base, and the drive electrode is connected to an output of the transistor. The transistor has a load impedance with a capacitive component to aid in the sustaining of vibration of the beam at a resonant frequency. A high ohm resistor is connected between the gate and the drain of the transistor to appropriately bias the gate. The bending of the substrate may be caused by a magnitude of a physical stimulus being measured. However, the bending of the substrate is not utilized nor desired in the filter and temperature sensing configurations of the invention. The frequency of resonance is an indication of the magnitude of the physical parameter. Variants of the sensor may be implemented with different placements of the sense and drive electrodes, and additional electronics as needed to implement the various configurations and microbeam geometry. Additional sense and/or drive electrodes and beams also may be incorporated in the transistor resonant microbeam sensor.